Guide to Danmaku Shooters

What to look for and how to react

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Table of Contents

Introduction 1

Before we begin 1

1. Shot types 3

Non-related shots... 4
Related shots... 5
Aimed shots 8
Bullet streaming... 10

2. Common pattern arrangements 13

The Obstacle Course 13
The Hurdles... 16
The Wall 17
The corridor 19

3. Final Tips 21

Introduction

You've played danmaku shooters. You've died countless times in them. You've wasted asinine amounts of money at the arcade, unintentionally becoming its primary benefactor in the process.

You can't quite manage to clear these games and yet, despite everything, you keep coming back to them for reasons you can't quite understand. If this describes you, you've found the right book.

This book teaches the basic tricks to playing (and surviving) games of the danmaku (also known as "bullet hell" or "curtain fire") shooter genre. Because these games revolve around making the player avoid wave after wave of elaborate bullet patterns, there are ways to take advantage of those patterns to raise your chances of survival. Knowing what to look for and how to react goes a long way towards finishing these games.

Before we begin

Because the basic ideas behind the design of these games are the same, this book is intended to explain basic techniques that are meant to apply to most games in the genre. For this reason, this book will not cover anything specific to any single game. This includes things such as game-specific mechanics and scoring.

This book is intended for people who are at least somewhat familiar with danmaku shooters, and assumes that they know the most basic concepts that are common to the genre, such as controls and hitbox sizes. If you do not fall into this category, play around with any game in this genre for an hour or so, and many of the ideas here should start to make sense.

Most of the ideas in this book were gathered from personal experience. Most of the terminology used is my own, the perception of these patterns are based on my own interpretations, and the tips are based on how I play. While they work for me, they are, of course, not the only way to play these games. Although I am giving advice that I hope will be helpful, I also encourage you to try new things and see what works for you.

Psychology and Danmaku

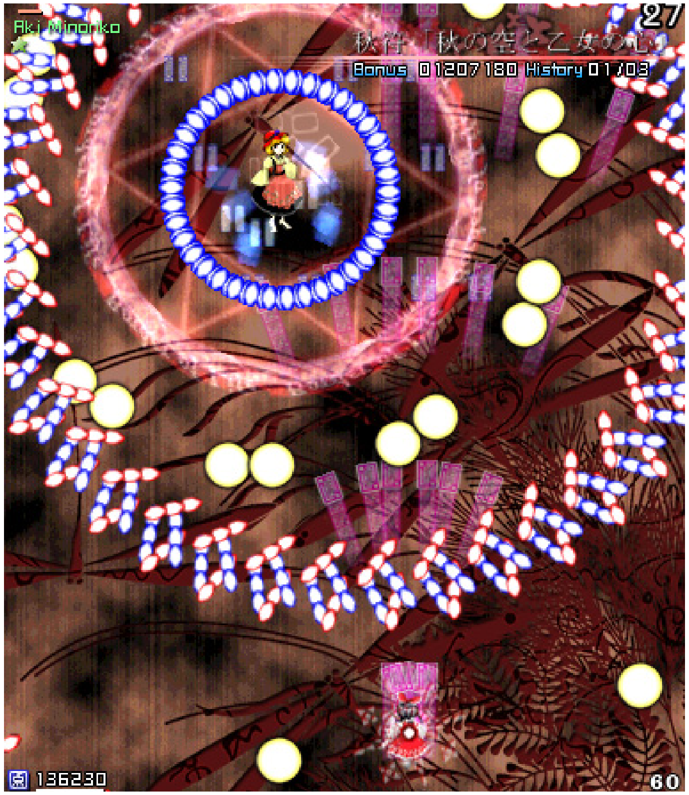
This is productive. Really.

While studying for my psychology major, I realized there were many connections between danmaku games and perceptual psychology. Amusingly, I found I was well-prepared for my psychology exams despite wasting a lot of time playing these games, because certain bullet patterns made for perfect examples of different kinds of human perception.

Note that I hold no responsibility for what may happen if you try to follow this study pattern.

Because part of the difficulty of these games is because it plays on the way we naturally perceive things, I thought it would be interesting to include some information on the mechanics behind human perception. These boxes will explain those mechanics, and show how they affect the player and the gameplay.

1. Shot types



Although danmaku shooters regularly throw hundreds of bullets at you, game designers know you are only human and can't actually keep track of so many objects at once. So while many patterns are flashy and impressive (or intimidating) to look at, most of the bullets are not actually threatening to you, depending on the way you move. Identifying which bullets are threatening and which ones are red herrings is the key to survival.

Above is an example of the average bullet pattern. If you group bullets of a certain color or shape together, you'll find that each group of bullets fly in a pattern that differs from those of other groups. I call each of these groups "grids."

Most bullet patterns are made up of two or three overlapping grids of bullets, and each grid presents a different threat to the player. Some grids are merely meant to dazzle and distract, but some restrict your movement while others make you move when you would rather not.

To safely nagivate any given bullet pattern, you have to find a way to move that avoids the combined threats of every grid. And to do that, you need to understand the rules behind them.

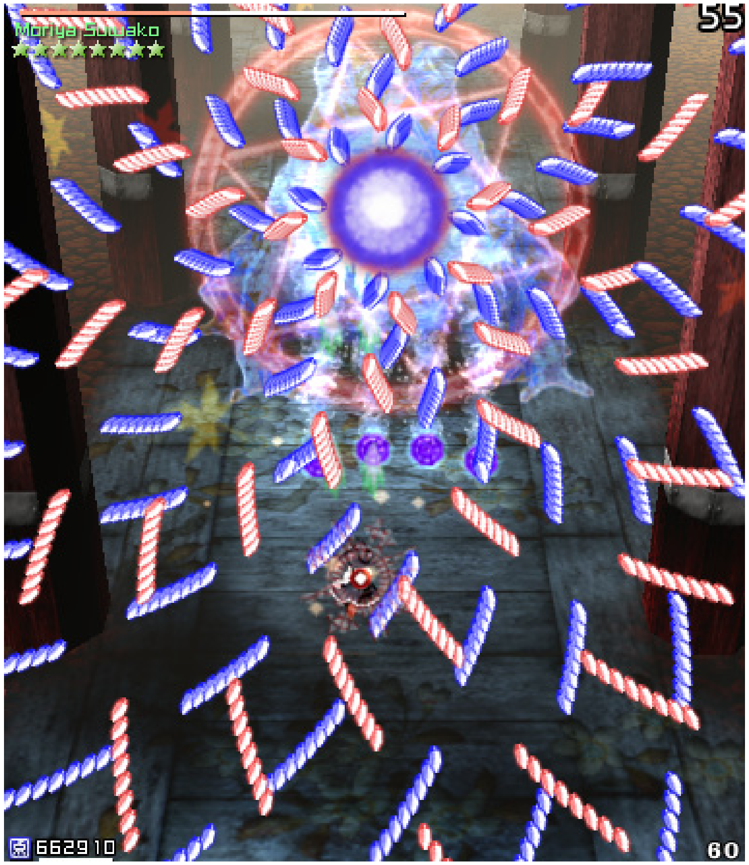
I've noticed that all bullets can be loosely placed into three categories.

1. Non-related shots: Bullets that are oriented in a way that is totally unrelated to where the player is.
2. Related shots: Bullets that are oriented in a way that is dependent on where the player is.
3. Aimed shots: A type of related shot. These shots are fired directly at the player.

A grid of bullets is a group of the same type of shot. Each type of shot needs to be dealt with in its own way, but sometimes that way conflicts with what you need to do to deal with another type of shot that is on-screen at the same time. That's half of why these games are hard — you need to figure out what you need to do so that you can safely handle every grid of bullets at once.

Chapter 1

Non-related shots



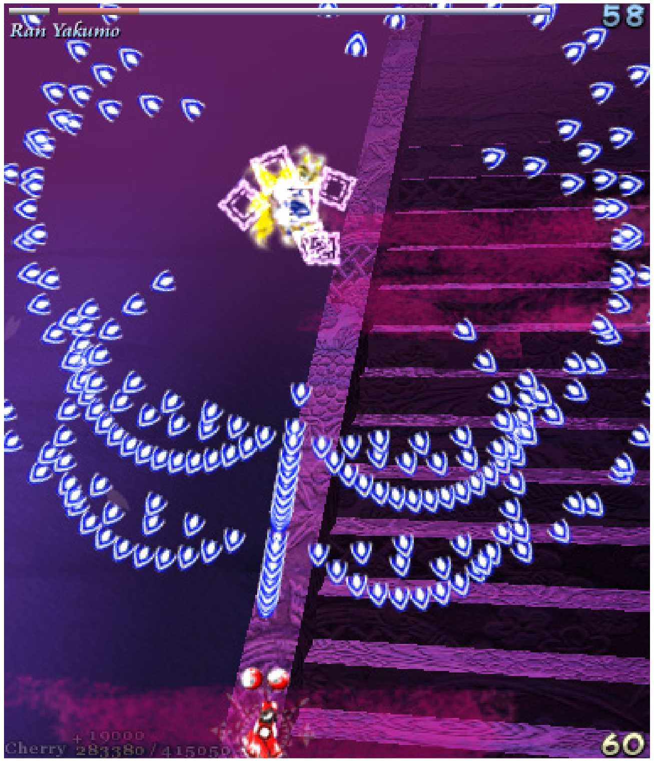
What they are:

These are the patterns that go by their own rules. Where you are or how you move has no effect on the pattern itself. This is both a good and a bad thing. If it's difficult, it will always be difficult no matter what you do, but on the other hand, you can move as much as you want without worrying about whether you're disrupting the pattern and making it harder to read, which is a concern that applies to the other two shot types.

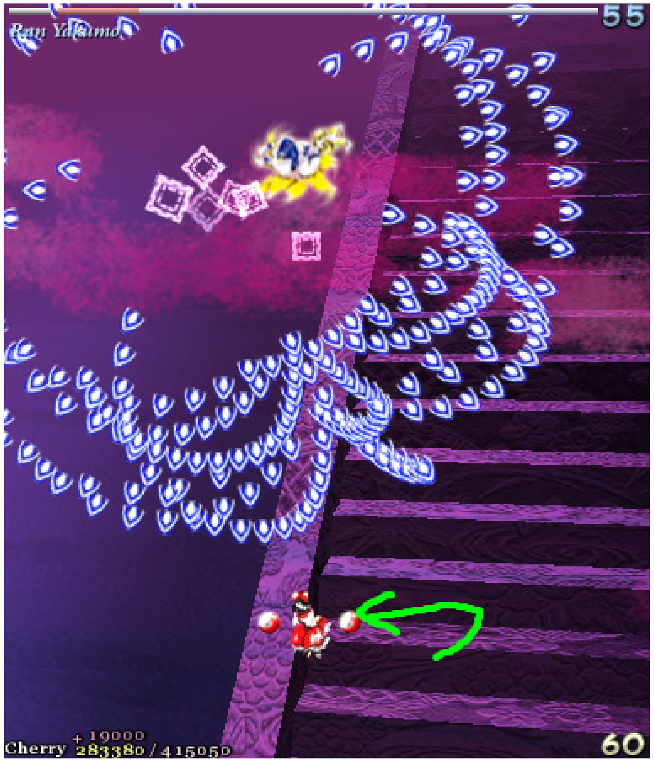
How to avoid them:

There is no easy answer to this shot type. You simply watch the pattern and dodge as necessary. Most patterns leave obvious gaps that you are meant to fly through, so use them if they are there.

Related shots



Hold still while the shots are being fired, and the pattern comes out very neatly, with a clear gap to fly through.



But if you move while it's being fired, the pattern warps with your movement — becoming much harder (sometimes impossible) to dodge.

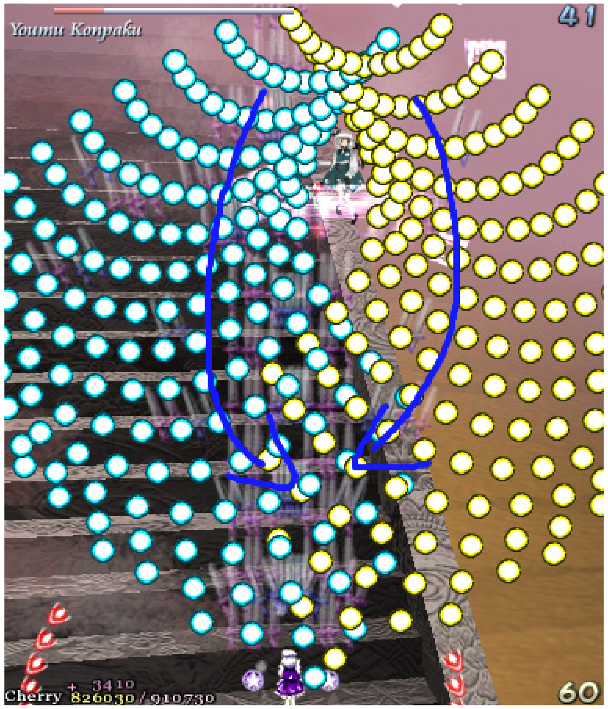
What they are:

This type of pattern is oriented in some way to the player's position. This relationship can be very obvious, but sometimes it can be so subtle that you can see the same pattern dozens of times without noticing it.

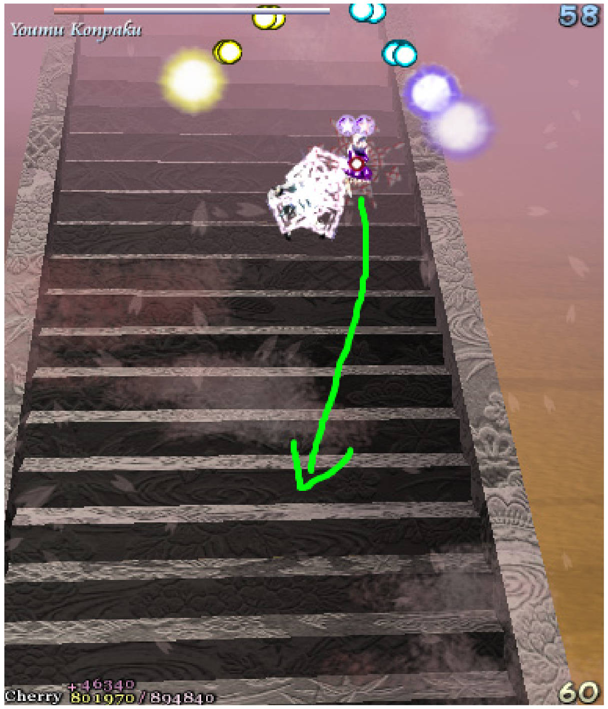
How to avoid them:

This depends on how closely the shots are related to you. Usually, you treat these like non-related shots and dodge according to the pattern itself, but try to move as little as possible. This is because the pattern is related to where you are. The more you move, the more the pattern changes, and the harder it becomes to predict it. If the shots are fired in a way that is related to you, holding still makes the pattern more organized and easier to figure out.

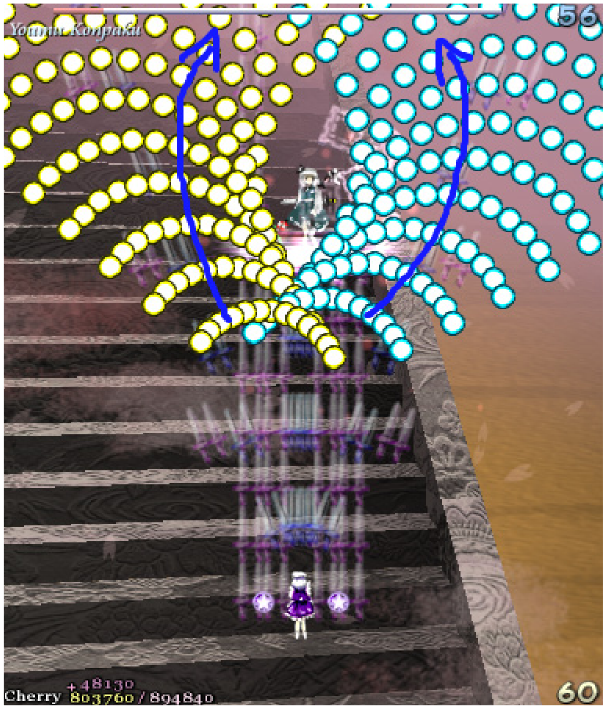
Sometimes there are ways to take advantage of the fact that the shots are related to where you are. Depending on how exactly they are oriented to you, sometimes you can lure the shots to be fired in a direction that makes them less threatening, as shown in this example:



This enemy normally fires a large spread of bullets in your direction.



So if you position yourself behind the enemy, and then fly back down as the pattern is fired...

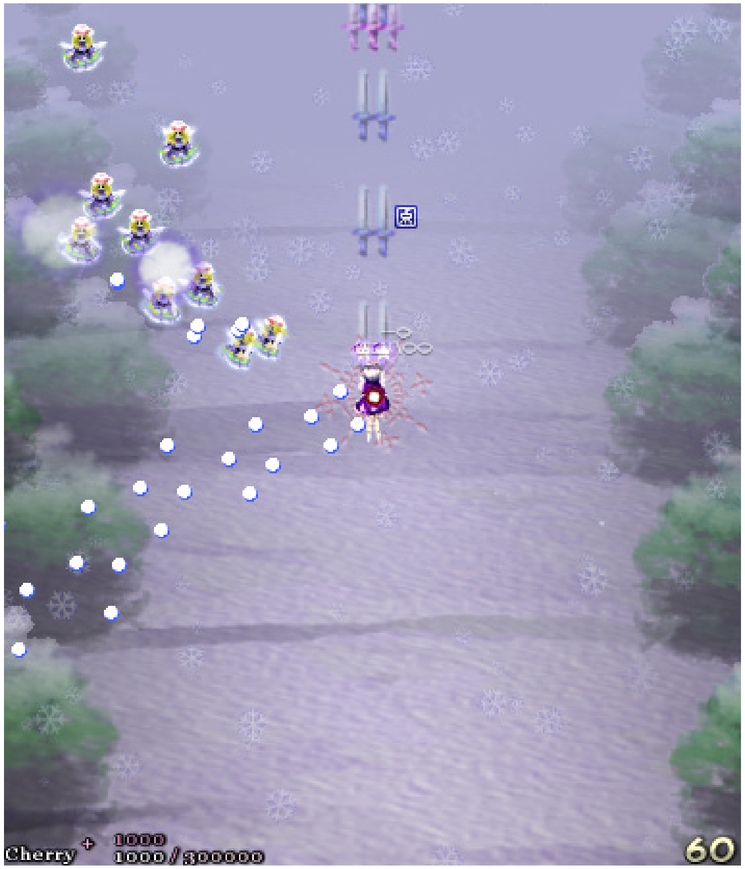


...the bullet spread moves up and off-screen, leaving you completely safe.

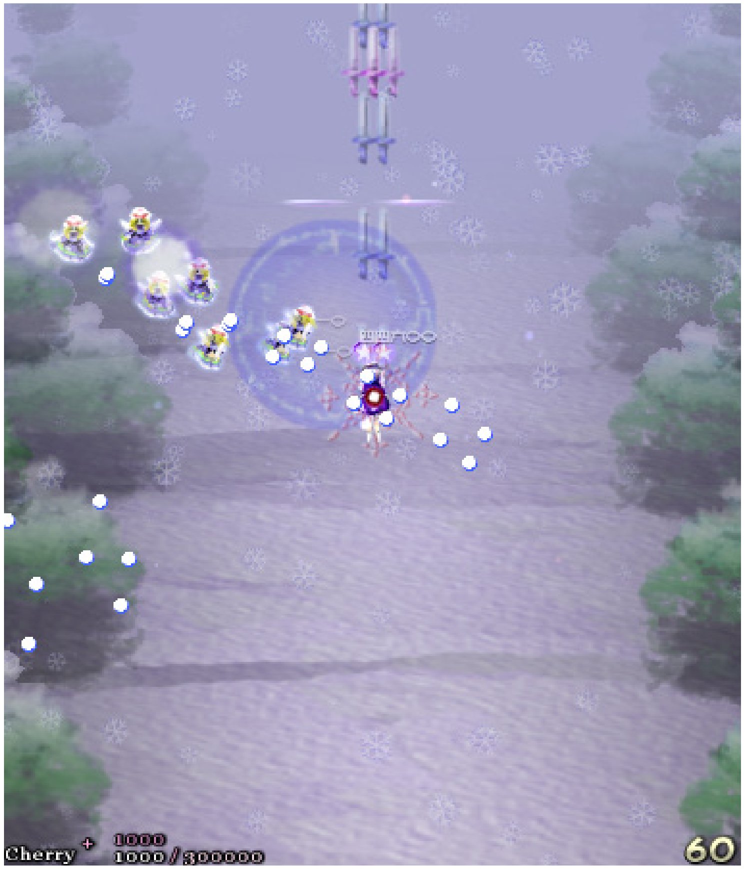
Finally, if related shots are fired in groups towards you but none of them are flying directly at you, you can do something very simple: don't move at all.

Note that while this is very effective in the right situations, it's not a good idea unless the player knows exactly what will happen next, because this type of shot is often used in combination with other shot types.

For example, if you are holding still and letting a wave of bullets fly by, you are trapped within those bullets until they have all passed you. Should some other bullet fly directly at you during this time, you can't avoid it.



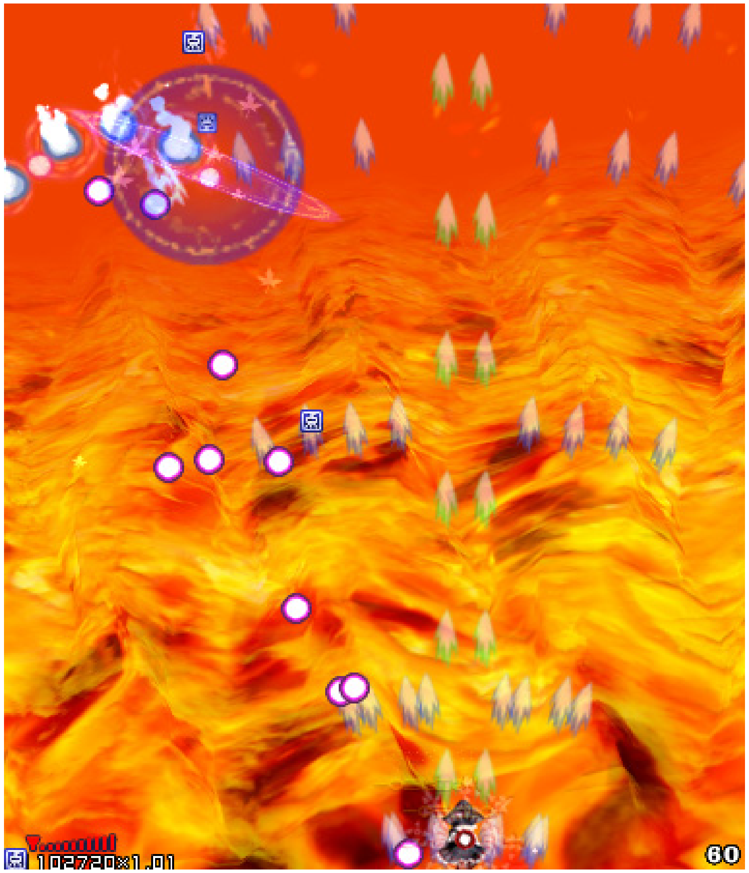
These shots are fired in pairs, so they are not aimed directly at you.



This means that they will harmlessly fly past you — but only as long as you hold completely still.

Chapter 1

Aimed shots



What they are:

This type is a specific kind of relational shot, and its name is the most self-explanatory of the three. It is any bullet that is fired directly at the player and will hit if the player does not move. These shots are usually fired one after the other, and at higher difficulties, they are fired in spreads of three or more at a time.

How to avoid them:

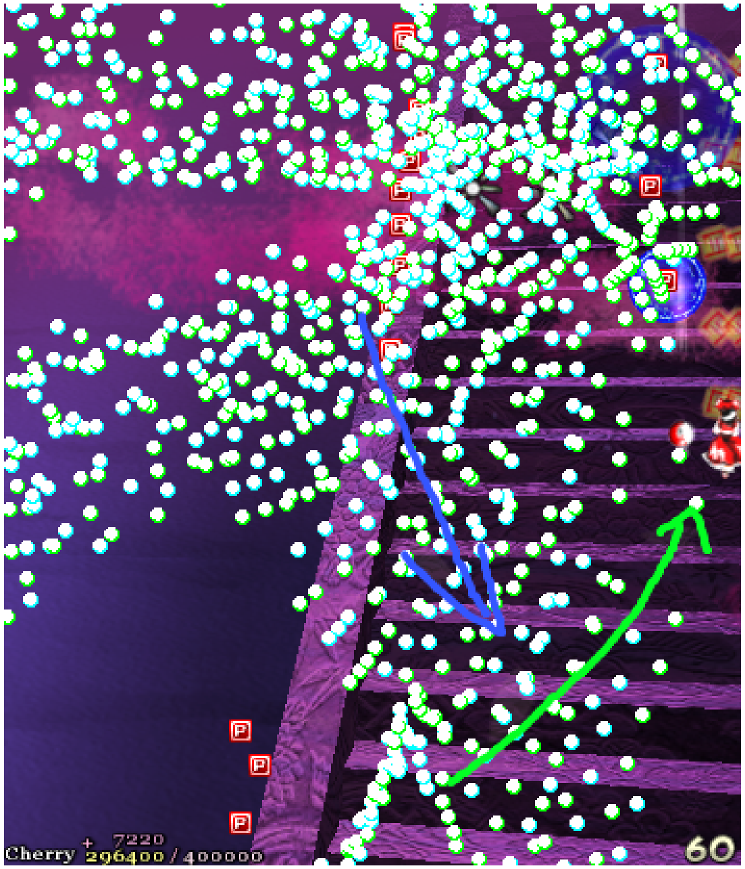
The short answer is to get out of the way. As soon as the shot is fired, it moves in a straight line towards where you were at the time of firing. All you need to do is move out of the way before it reaches you. And like all relational shots, you can lure them in whatever direction you want.

That sounds simple enough, but this type of shot is probably the most commonly encountered type in the genre because it does something very important in the design of these games: it forces you to move. And if there are other bullets on-screen serving as obstacles, then moving to avoid aimed shots without running into something else becomes something that is very difficult to do.

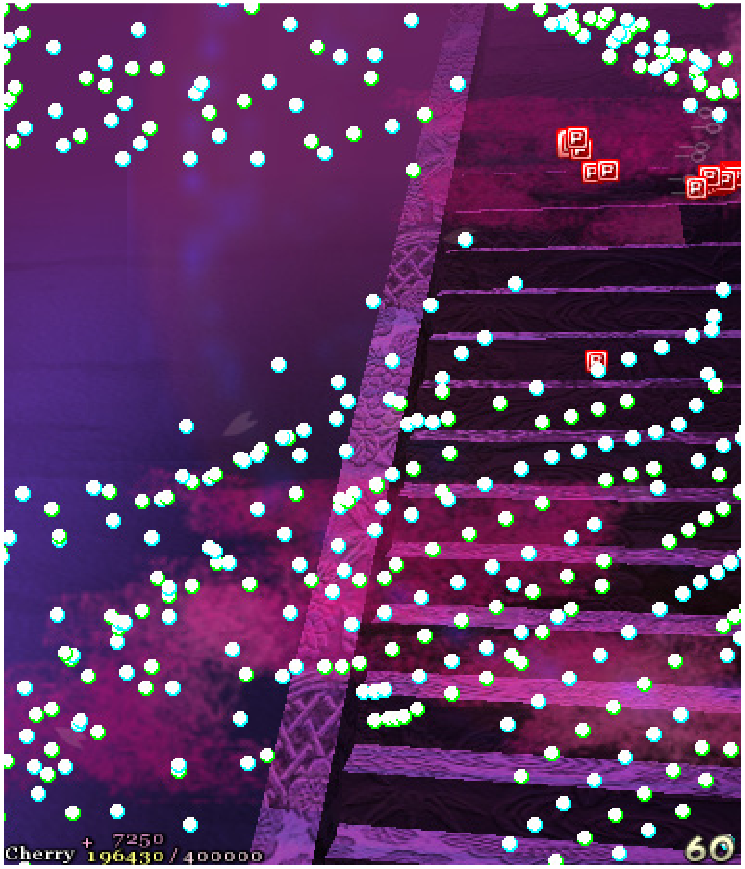
You've already seen that a single bullet aimed at you is easy to avoid. But what if these bullets are fired at you repeatedly, possibly from different directions?

Shots fired repeatedly cover the space that you just moved away from, which makes you reluctant to move back through them because it means flying through streams of bullets. This means you are denied the space that you just moved away from, and as this continues, you are effectively herded in a single direction. If this continues long enough, you will end up trapped.

This brings up what is probably the single most valuable trick to use when playing these games. It's commonly known as bullet streaming.



As you avoid repeated aimed shots, you get pushed into the corner, where you have nowhere to go but up.



...and going up in these situations usually ends in death.

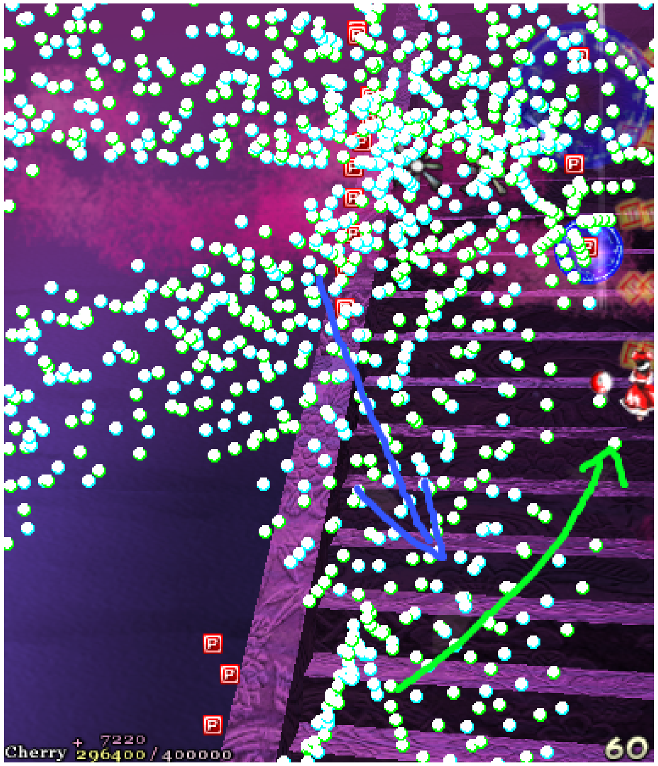
Bullet streaming

Bullet streaming is as a way to avoid multiple aimed shots fired repeatedly for long periods of time. It's characterized by two traits:

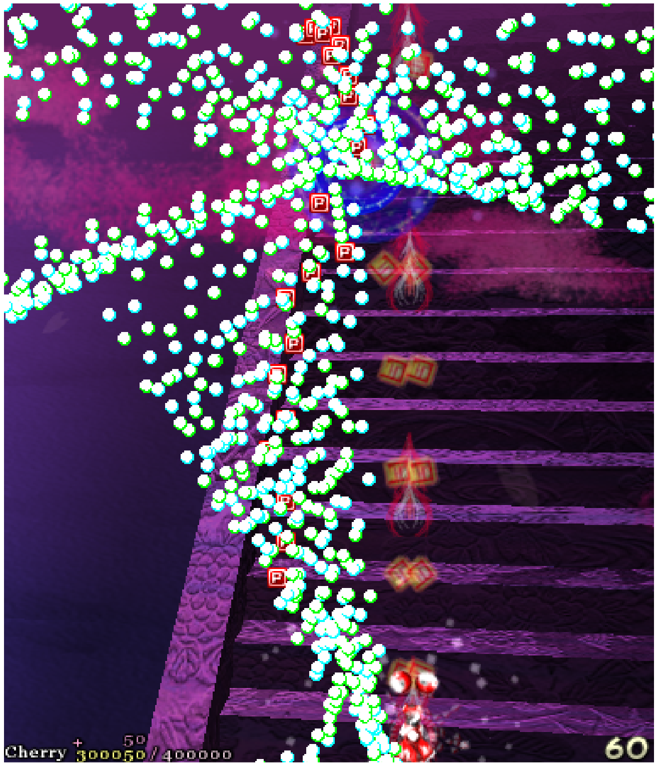
1. Moving as little as possible to dodge aimed shots as you move towards one side of the screen.
2. Safely giving yourself space to start dodging in the other direction before you get cornered.

Moving in itself already dodges an aimed shot, but moving as little as possible means that you can dodge successive aimed shots while covering very little ground at the same time. Not only does this mean that you will not reach a corner as quickly, but it also collects the aimed shots into a narrow stream, giving you more empty space to move in.

Minimal movement means that it'll take a longer barrage of aimed shots to corner you, but it will still happen eventually. This is where the second half of bullet streaming comes in.



Volleys of aimed shots dodged by moving a lot.



The same volleys dodged using minimal movement. Note how the streams of bullets are taking up much less space.

The main reason that you get cornered is because it's too risky to fly through the barrage of bullets that you just dodged. If you moved as little as possible, this issue is emphasized, because the streams of bullets you just dodged are clumped together into a near-solid wall that would be suicidal to fly through.

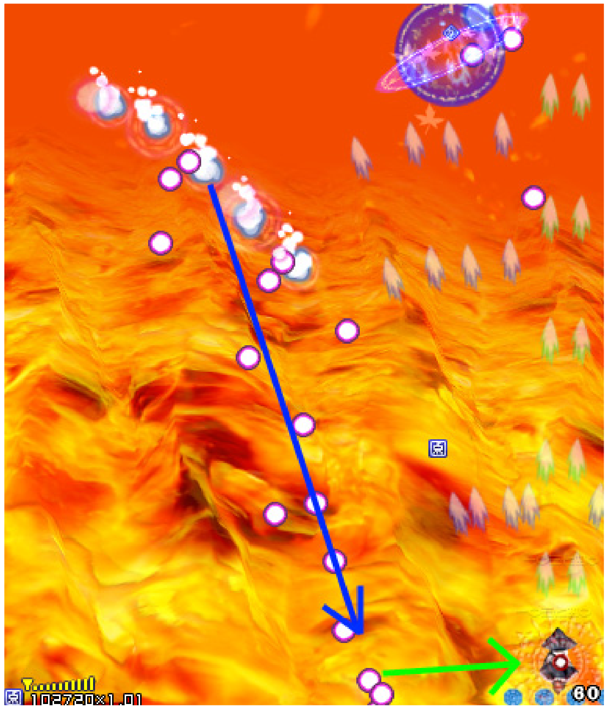
The solution is the exception to the first rule: Before you reach the corner, make a large movement that makes their aim shift drastically. This usually means moving straight towards the corner. If the source of the aimed shots is diagonally across the screen, then moving up also helps, as it makes their aim shift further.

This movement gives yourself a chance to cross that wall of bullets. Moving quickly makes a gap form in the mass of bullets that are being fired — a space that is possible to escape through.

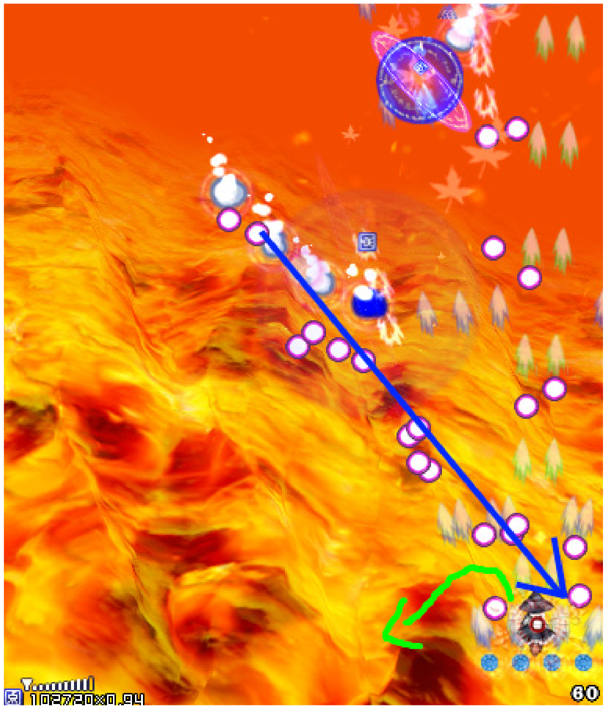
Note: If there are regular pauses in the aimed shots, time your movement so that it is made during a pause. This makes the gap even less populated with bullets.

The whole cycle is not always as easy as it sounds, but it's a way out. Once this space is made, fly through it. If timed properly, you should have lured the aimed shots so that they are now herding you in the other direction.

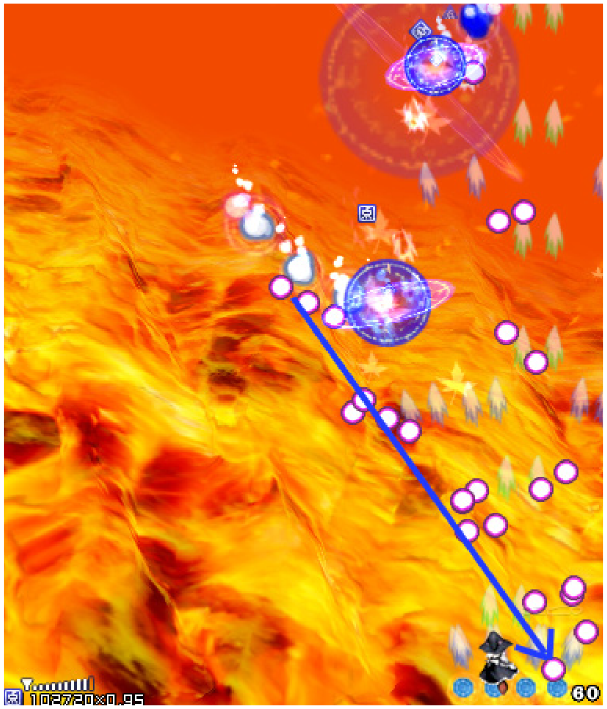
This gives you space to inch towards the other side of the screen to continue dodging. The entire cycle can be repeated as many times as it takes, giving you the time you need to shoot down whatever is firing those aimed shots at you in the first place.



Make a fast movement to shift the angle of the aimed shots.



Look for a gap to slip through.



Congratulations, you've crossed the stream of bullets.

Recognizing the shot types in each bullet pattern goes a long way towards figuring out a way to navigate through them. But remember that you rarely get only one type of shot coming at you at once; bullet patterns tend to be made up of several grids of bullets, each of which are made up of a different shot type.

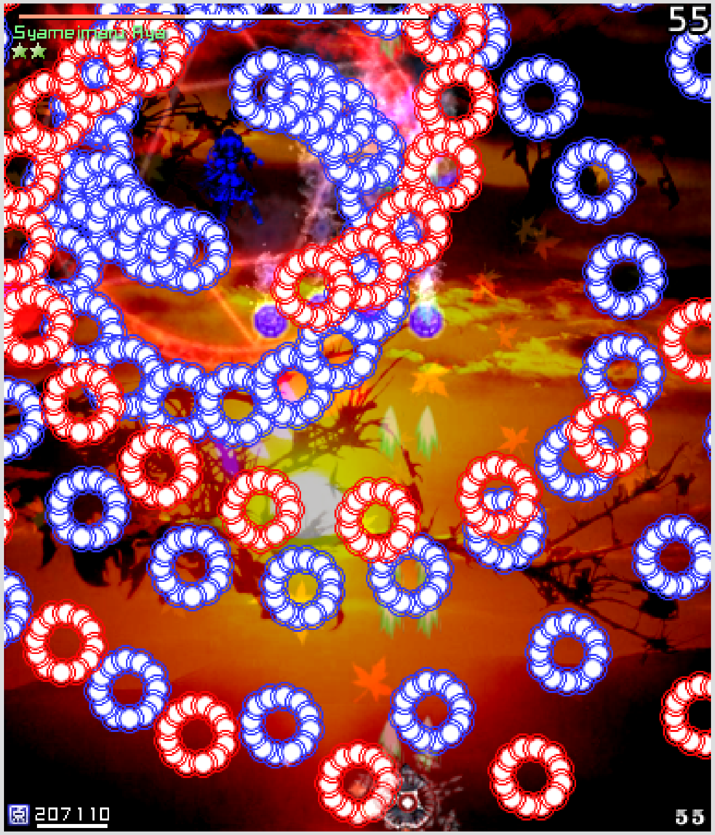
Psychology and Danmaku

Chunking

Human perception can only keep track of so many things at once. It's already notoriously difficult to do two or more different actions at the same time, so keeping track of every single bullet in any given pattern is simply out of the question.

Fortunately, the mind is good at grouping things together. "Chunking" is one of the tricks that people use to make more efficient use of mental resources. Although the human mind is commonly considered to be able to hold around 4 to 9 separate things in short term memory, each of those things can be remembered *in detail*. So by grouping related issues into "chunks," we can commit many things to memory as single items with unique properties, instead of dozens of somewhat related items.

The same thing applies to bullet patterns. You can't track a hundred separate bullets moving in different directions, but it's not so bad if you group them into a handful of different categories and think of them that way. Some patterns, like the one on the right, readily lend themselves towards this sort of grouping. Just remember that they are groups of objects, not solid walls — just in case you need to fly through them.



2. Common pattern arrangements

Now that you know the different shot types, Here are some common ways these games use those shot types to make things challenging.

While many patterns simply throw projectiles at you and hope you can't dodge them, I've noticed there are several unique arrangements of patterns that designed to be difficult in different ways.

The Obstacle Course

What it is:

This type of pattern combines aimed shots on a grid of bullets (that may be relational or non-relational). This grid serves as a set of obstacles that confine the player's movement in some way. Aimed shots are then fired to force the player to move along those confines.

Why it is difficult:

Both the grid and the aimed shots are very real threats to the player, but the difficulty behind this type of pattern is in the way it attempts to force the player to deal with both at the same time. You can only keep track of so much at once, and what this pattern tries to do is to overload what you can perceive at any given time.

When faced with two different threats at once, the player may end up too busy watching the grid and make a mistake dodging the aimed shots. Alternately, the player may pay too much attention to dodging the aimed shots, and end up running into the bullet grid.

How to deal with it:

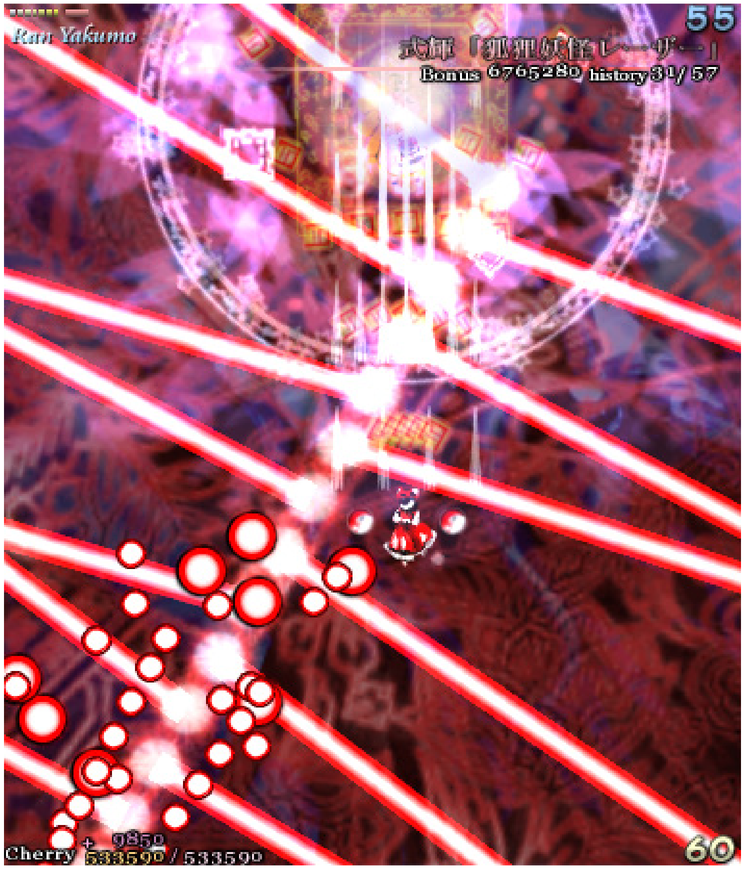
The obstacle course is usually a single grid made up of non-related shots, or shots that are so subtly related that it almost makes no difference. The point of this grid is to hinder your movement, but because it's a pattern, you just need to understand what those confines are and then try to work within them. It can often be remembered as a simple rule like "don't move horizontally" or "don't move too far in this direction."

Once you know that, just keep the grid's rules in mind and work out a way to dodge the aimed shots that also follows the rules set by the grid. If you understand either the grid well, you will barely need to look at the grid to avoid running into it. In which case, you can trust keeping track of the grid to your peripheral vision, and then concentrate on dodging the aimed shots.

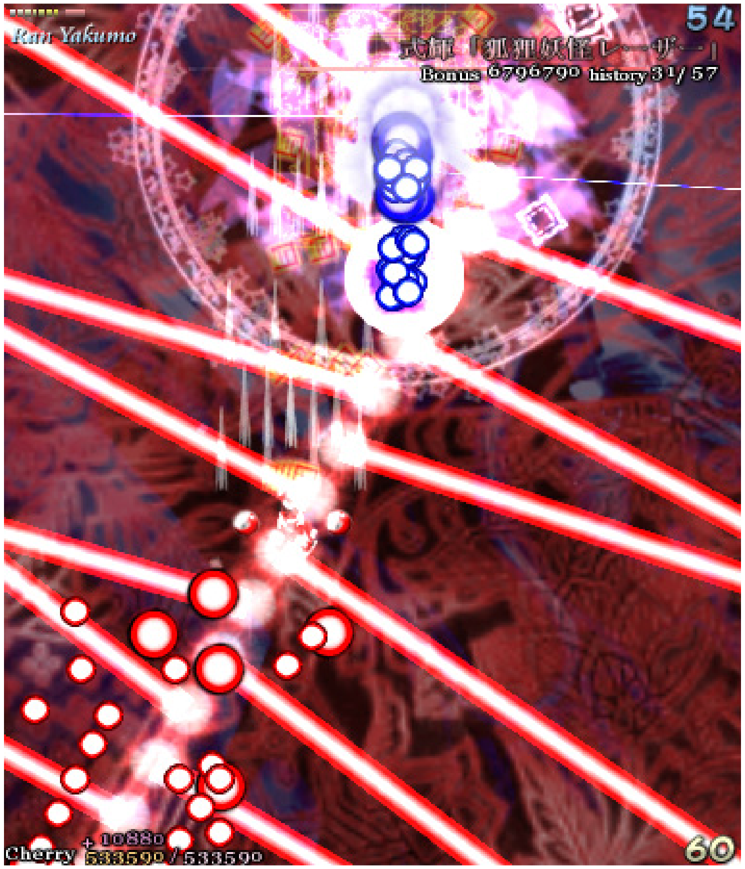
Alternately, you can flip things around and move in a way that dodges the aimed shots while keeping an eye on the grid. The main point is in dealing with the easier of the two threats by working out a movement pattern that avoids it by nature so that you can put the bulk of your attention on the other. In this way, you can deal with both threats without splitting your attention too much.

Here's an example of a simple obstacle course.

This pattern fires bursts of aimed shots at you that leaves a grid of lasers in its wake. The grid makes it obvious where you can't go, so all that's left is to lure the next set of aimed shots in a way that leaves you an escape path.



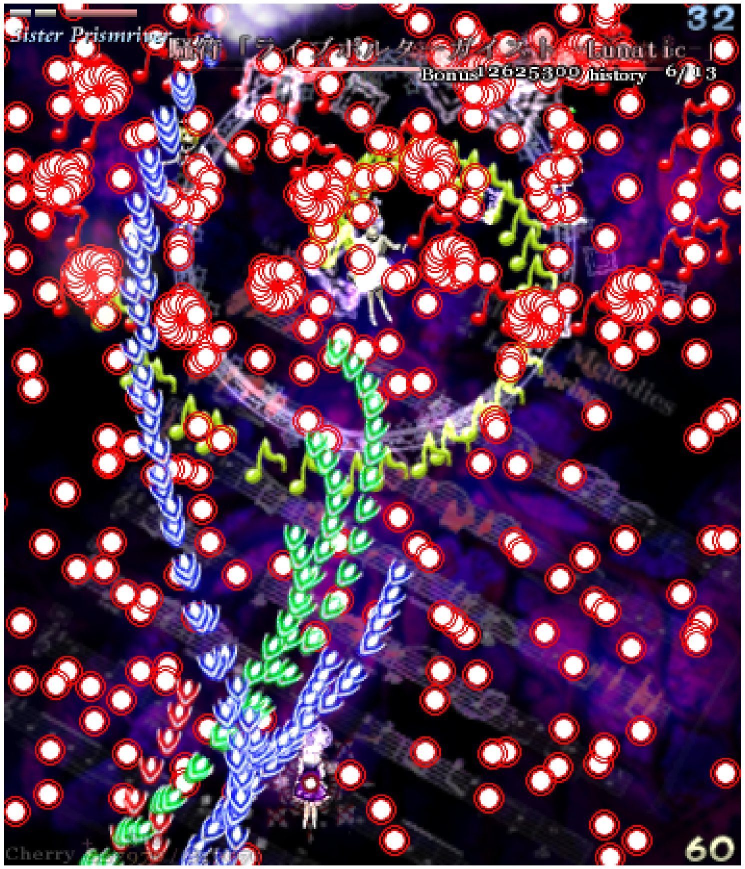
Wait for the aimed shots...



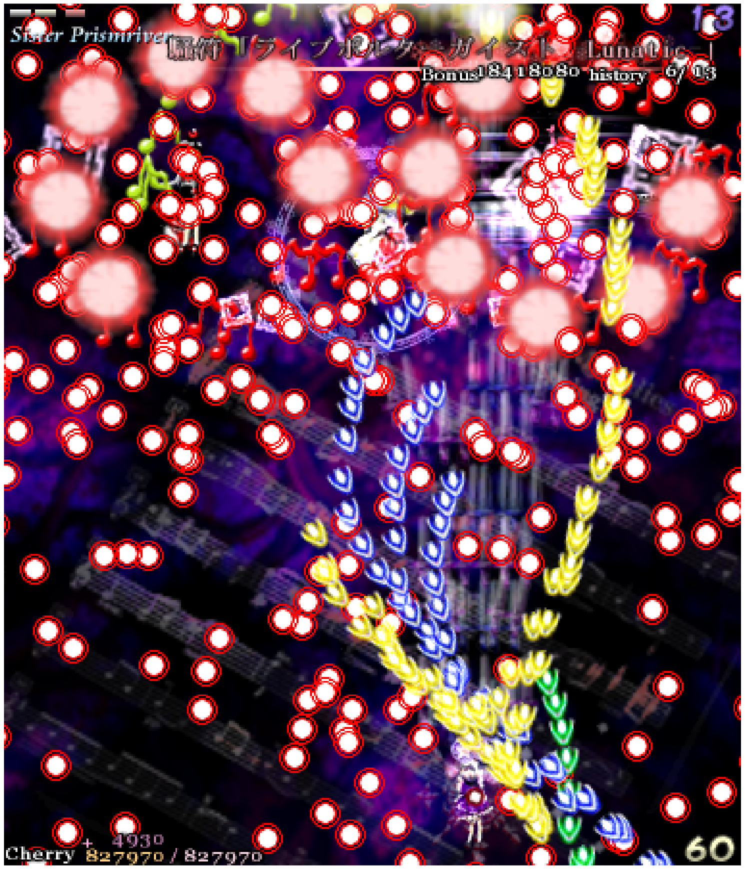
...and then escape them by moving within the confines of the grid. Here, the player moved left because staying near the middle of the screen makes it easier to hit the boss, but moving right works too.

Here's an example of a much more difficult obstacle course.

This pattern showers the player with unrelated shots while firing volleys of aimed shots one after the other. The player uses bullet streaming to avoid the aimed shots, but has to be careful not to run into the unrelated shots in the process. It's easier said than done.



The green, yellow and blue bullets are aimed shots. The player has to stream them while taking care not to run into the red bullets.



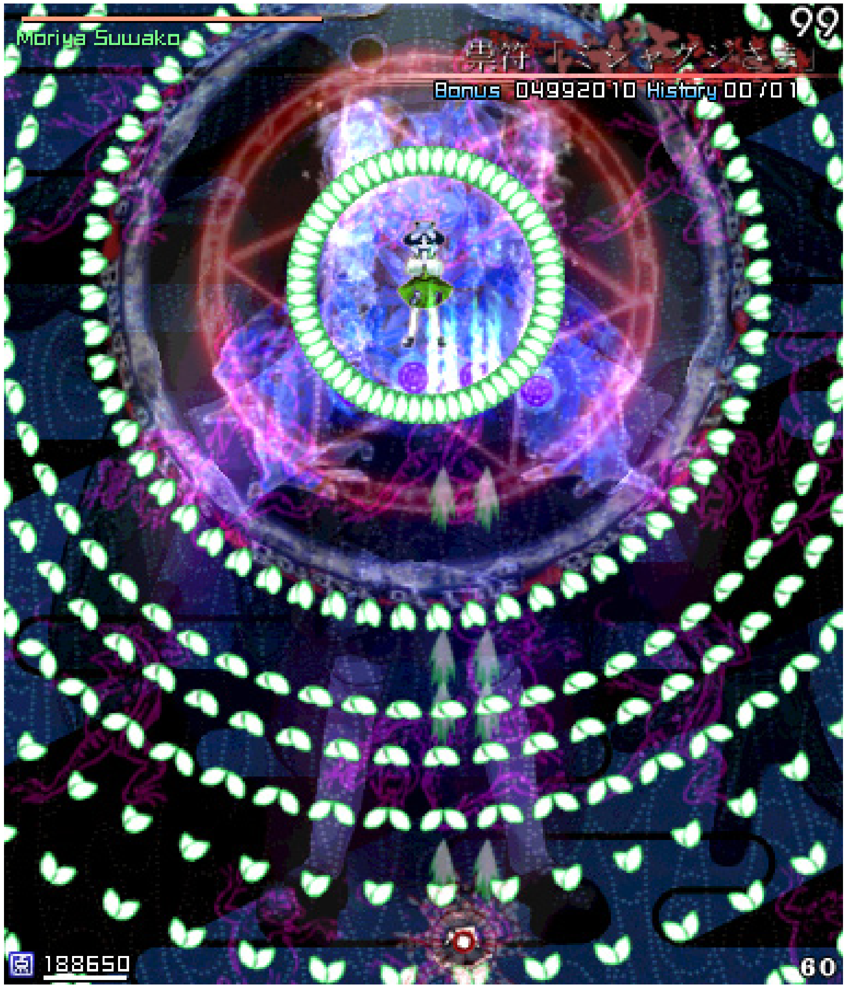
The same thing done in the opposite direction.

Chapter 2

The Hurdles

What it is:

This type of pattern presents the player with line after line of bullets with gaps that you must slip through in succession. They are simple to perceive, as you only need to look for gaps in the lines, but it can be hard to dodge through line after line without making a mistake.



Why it is difficult:

A common hurdles-type pattern consists of sets of two rings of bullets that spin in opposing directions. The spinning rings create gaps that open and close within them, and the rings also expand outwards, forcing the player to fly through them.

In such a pattern, difficulty depends on the size of these gaps, how quickly the rings are spinning/expanding, and how closely the rings are packed together.

This type of pattern is often too easy on its own unless it is very dense, so sometimes a grid of unrelated shots are included. Alternately, each ring can be made deeper so that you are forced to cross more than one ring at once. Both of these things dramatically raise the difficulty of this type of pattern.

How to deal with it:

To dodge these patterns, you must position yourself well enough to fly through a gap in each ring, move quickly enough to cross the gap before it closes, and be able to position yourself to repeat the process.

Patience is the key. As long as you are methodical about dodging through each line of bullets, you should be fine. Don't rush yourself, and don't get frustrated if you make a mistake.

The Wall

What it is:

This pattern is hard to define because it comes in many forms. At heart, this type of pattern presents a dense wall of slow-moving bullets without immediately presenting a threat that forces you to move through it. As the pattern continues, you are slowly deprived of space to move in until you are forced to cross the wall anyway — but under much more difficult circumstances.

Why it is difficult:

The presence of aimed shots throughout these games quickly ingrain a habit of not moving more than necessary. The Wall specifically takes advantage of this habit.

This pattern type is particularly deceptive because it is hard to recognize before it is too late.   The walls of bullets are not always recognizably walls with safer spots behind them, and because there is no immediate threat, you feel no obligation to move.

But as this pattern continues, the walls of slow-moving bullets slowly encroach on your space until you are forced to cross them. It's usually not easy to cross these walls to begin with, but it's even harder when you don't have the time or space to wait for a good opening to show itself.

How to deal with it:

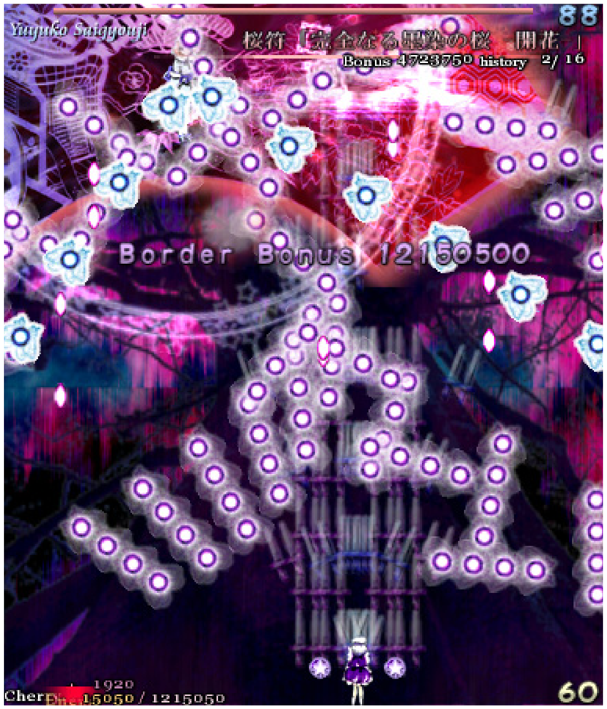
You are not immediately threatened in this pattern, so it feels safer to simply sit still instead of taking the risk of flying through the buildup of slow-moving bullets, opting to dodge at the last second. This is exactly what you *shouldn't* do.

The slow-moving bullets will only build up and become harder to cross as time passes, so even if it looks tough, you need to bite the bullet and escape as soon as you see an opportunity to do so. Don't wait until the last second - cross the wall before it forces you to.

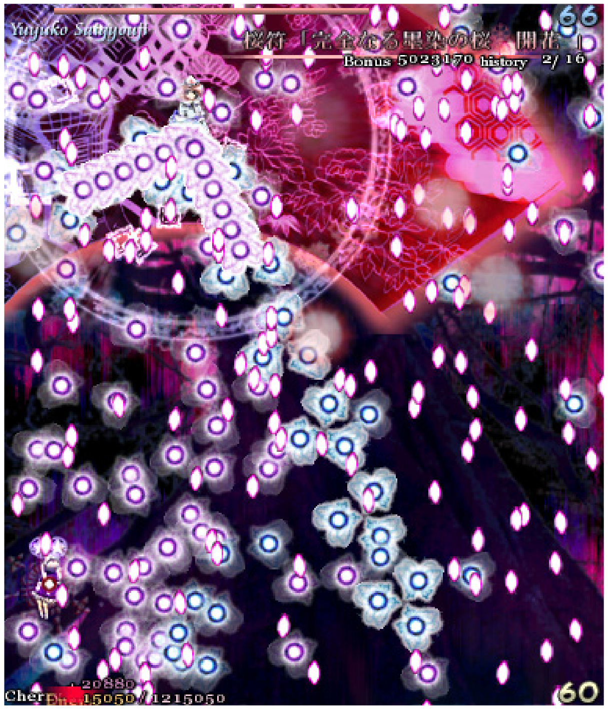
Here's an example of a difficult wall-type bullet pattern.

The sets of blue and purple round bullets are relational shots that alternate between flying past you and flying directly at you. Between them and the shower of small diamond bullets, they can eventually build up into a wall if you hold still for too long. The key is to steadily move from one spot to another so that the relational shots become too scattered to ever build up.

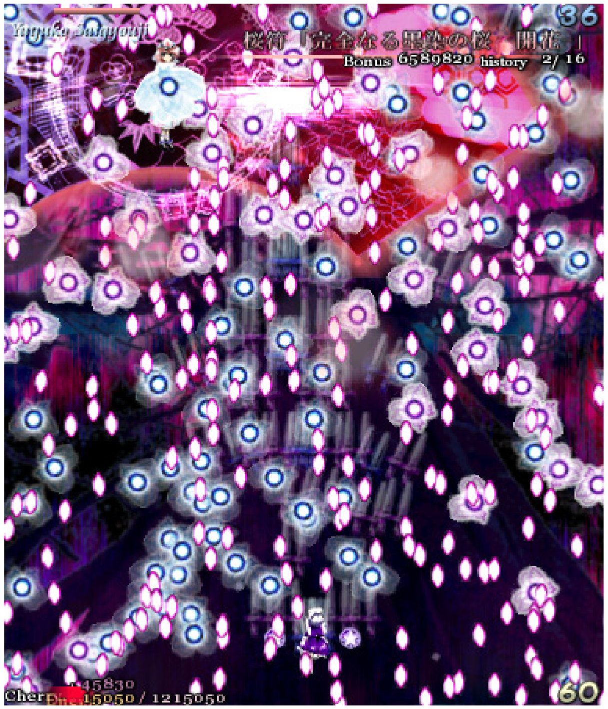
This pattern is especially difficult because the trapping is done so subtly that the player often doesn't realize it until it's too late. It's hard to tell at first glance that moving more would keep the player safe in the long run, so there is no incentive to do so. As a result, many players sit in place, only moving enough to dodge the aimed shots — and eventually get trapped.



These purple and blue bullets alternate between flying towards you and right around you.



Between them and the diamond-shaped bullets, you can wind up in a tight spot before you know it.



The key is to keep moving from one place to another so that the bullets never get a chance to build up around any one spot.

The Corridor

What it is:

This name is pretty self-explanatory – patterns of bullets line up and form corridors that you need to fly through.

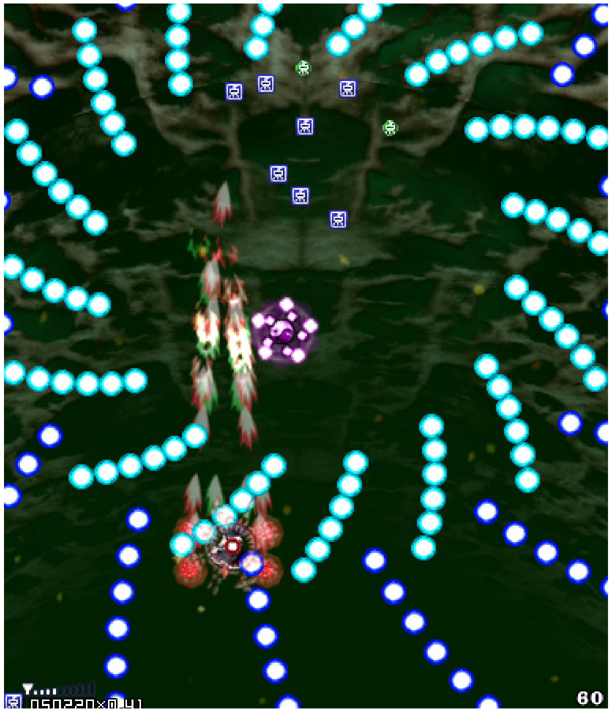
Why it is difficult:

This is the tricky part. The difficulty is not in looking for an escape path, because it's obvious where you have to go. The problem is not in the pattern itself, but in the way you have to move in these games. In other words, it's your controller.

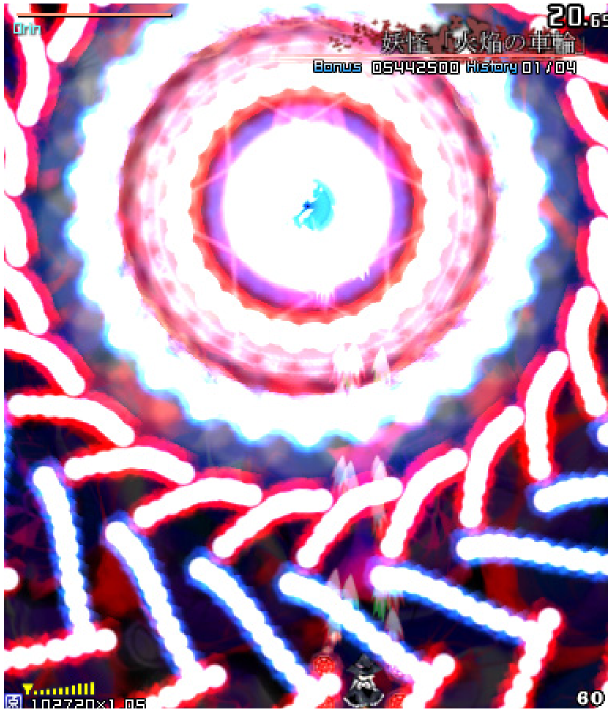
These corridors generally make you move in curves, but you can only move in straight lines on a digital controller – and these games almost never feature analog controls. You're forced to move in a way that at somewhat resembles a curve, but that creates points where you are very close to the sides of the corridor. And the more narrow the corridor, the harder it is to navigate.

How to deal with it:

Because the corridors of bullets fly towards you, you do not actually need to fly forward yourself to pass them. Stick to mostly left or right movements, and let the bullets fly past you. Simplifying your movement in this way makes things much easier.



An example of a simple corridor pattern. Note how wide the corridors are and the space at the end to position yourself for whatever comes next.



An example of a difficult corridor pattern. Not only are the corridors narrower, but there is also no space to reposition yourself for the next curve.

Psychology and Danmaku

Inattentional Blindness

This is the term for what happens when you completely miss one thing because you were too focused on something else.

The image above is taken from a well-known study where one group of people was asked to keep track of how many times a ball was passed between the people of another group. Repeatedly, the group that was watching concentrated so hard on their task that they completely missed the appearance of a woman in a gorilla suit — even when she walked right past them.

While inattentional blindness happens in everyday life, certain people specifically take advantage of it. Thieves sometimes use it. Magicians live off of it. And the designers of these games use it.

Any given player can't keep track of everything at once, so he or she has to selectively choose what to pay attention to. The "obstacle course" type of bullet pattern is one of the applications of inattentional blindness, but it happens all the time in many different ways.

Possibly the most common cause of death in these games is when a player is so focused on dodging a screen of bullets that he or she misses that one errant bullet off to the side — and inevitably rams it.

3. Final Tips

Hopefully most of that stuff made sense and you now have a better idea of what to look for and what to do in various situations. All that's left are a few thoughts that are useful to keep in mind while playing these games. Note that like all rules, many of these tips have exceptions.

1. Stay calm.

This may seem obvious, but it's really the most important thing you can do. Many players panic upon seeing a large spread of bullets, and either move recklessly (often running into something in the process) or simply freeze in place. At first glance, many bullet patterns are quite intimidating, so these reactions are perfectly natural. However, there's always a way through them, so the first thing you need to do is learn to suppress your initial panic so that you can think clearly.

2. Dodging is more important than shooting.

By design, certain enemies (particularly bosses) will require sustained fire for a period of time before they switch patterns and are eventually shot down. Because boss enemies tend to be large and your character's shot is often wide, hitting enemies is relatively easy, and is not something you need to worry too much about (unless you chose a character with a very narrow shot).

In short, worry less about what you're shooting at, and more about what's being shot at you. Just keep dodging while shooting, and enemies will eventually get shot down. The difficulty of these games is less about having the aim to shoot down your enemies and more about surviving long enough to shoot them down in the first place.

I'm not saying to ignore where you're shooting entirely, because this rule has exceptions. Some smaller enemies do need to be shot down before they shoot too many bullets, and shooting down certain special enemies (only in certain games) will remove all bullets on-screen for you, making your job much easier. Finally, some bosses are small and do require some aim to hit.

3. Don't move more than you have to.

Most bullets in any given pattern will not hit you if you stay still. And more often than not, you do not need to move very much to avoid the ones that will. In fact, moving around too quickly without any reason raises the chances of you running into something. As a result, being more deliberate and careful with your movement is usually more effective than trying to fly through things as fast as possible.

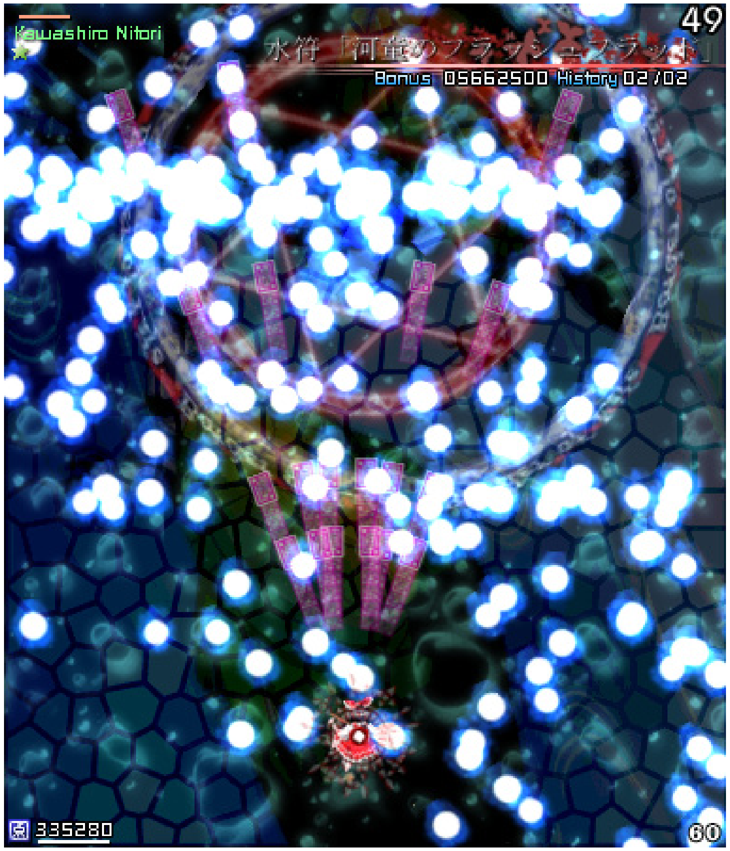
4. Peripheral vision is your friend.

Sometimes it helps to simply look at one spot instead of trying to look at everything at once. You'd be surprised at how much you can pick up in peripheral vision. If you keep your eyes between your character and the incoming waves of bullets, your peripheral vision should be able to pick up almost all of the threats that are headed your way.

When navigating particularly dense patterns, some players prefer to look directly at their character's hitbox, letting their peripheral vision handle everything immediately around them.

5. Sometimes it's easier to look at the gaps.

If a pattern has a lot of bullets moving in different directions or is particularly scattered, it can become too difficult to track every bullet that is a threat to you. In those cases, sometimes it helps to not look at the bullets at all, but look for the gaps in between them. This way, you're simply looking for one thing rather than trying to keep track of five or more things at once.



Watching the empty space within this swarm is easier than keeping track of individual bullets.

6. Practice makes perfect.

These games are not designed to be cleared on the first try. They are meant to make you want to practice and persist until you can finally finish them. Don't be discouraged; these games are designed to be challenging. Everyone has failed countless times playing these games, and everyone has made incredibly stupid mistakes in them. It's just part of the process. Just keep trying, and you'll eventually get it.

Psychology and Danmaku

Gestalt Laws of Perception

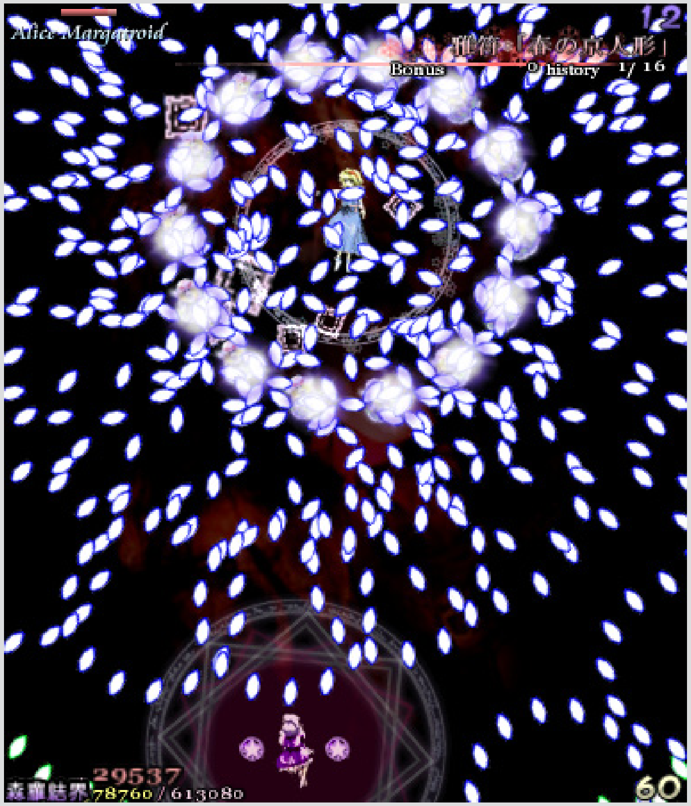
Law of Closure - The mind will group objects if they are arranged in a recognizable shape.

Law of Similarity - The mind will group similar objects together.

Law of Proximity - The mind will group objects that are close to each other.

These are not all of Gestalt's laws of perception, but they are the ones that apply most to the danmaku shooter genre.

These concepts form the core of how you perceive any given bullet pattern. Grouping multiple objects together happens naturally, and is a huge factor in determining your reaction to them. You may be intimidated because you interpret lines of bullets as solid walls, but you may also feel at ease because those lines can be committed to memory as a group.



It's chaos near the top, but do you see the overlapping rings near the bottom?

Index

B

Bullet streaming 10

C

Common pattern arrangements
  Introduction 13
  The Corridor 19
  The Hurdles 16
  The Obstacle Course 13–15
  The Wall 17–18

F

Final Tips 21

P

Psychology and Danmaku
  Chunking 12
  Gestalt Laws of Perception 23
  Inattentional Blindness 20
  Introduction 2

S

Shot types
  Aimed shots 8
    Bullet streaming 10
  Introduction 3
  Non-related shots 4
  Related shots 5